

Appl. No. : 10/817,200
Filed : March 31, 2004

REMARKS

This paper is in response to the Office Action dated September 20, 2006. Applicants have amended the application as set forth above. Specifically, Claims 48, 51-55, 59, and 64 have been amended. Claims 1-47, 60-63, and 65 have been canceled. In addition, new Claims 66-73 have been added. Upon the entry of the amendments, Claims 48-59, 64, and 66-73 are pending in this application. No new matter is added by the amendments as discussed below. Applicants respectfully request the entry of the amendments and reconsideration of the application in view of the above amendments and the following remarks.

Discussion of Amendments

The amendments to Claims 48, 51-55, and 59 are made to further clarify the configuration of the process chamber and relative position of the second inlet. Support for the amendments to Claims 48, 51-55, and 59 can be found in, for example, Figures 1 and 5B and description in paragraphs [0033], [0046], [0049], and [0072] of the specification.

In addition, the amendments to Claim 64 are made to further define the inlet plate. Support for the amendments to Claim 64 can be found in, for example, Figures 5A, 6A-6D, description in paragraphs [0072], [0074]-[0076] of the specification, and the original Claim 65.

Claims 66-73 depend directly or indirectly from Claim 64. They claim various shapes of the inlet plate of Claim 64. Support for Claims 66-73 can be found in, for example, Figures 5A, 6A-6D, description in paragraphs [0072], [0074]-[0076] of the specification, and the original Claims 53 and 54.

As such, Applicants respectfully submit that the amendments are fully supported by the application as originally filed and do not constitute the addition of new matter. Applicants respectfully request the entry of the amendments.

Discussion of Rejection Under 35 U.S.C. § 102

The Examiner rejected Claims 48-53, 55, 56, 64, and 65 under 35 U.S.C. § 102 (b) as being anticipated by Shang et al. (U.S. Patent No. 6,182,603). Claims 48-52, and 54 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Park (U.S. Patent Application Publication No.

2002/0189760). Claims 48-52, 54, 55, 57, 58, 64, and 65 were rejected under 35 U.S.C. § 102 (e) as being anticipated by Okuda et al. (U.S. Patent Application Publication No. 2003/0213435).

The Law of Anticipation

Anticipation under Section 102 can be found only if a reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 778 F.2d 775 (Fed. Cir. 1985). More particularly, a finding of anticipation requires the disclosure in a single piece of prior art of each and every limitation of a claimed invention. *Electro Med. Sys. S.A. v. Cooper Life Sciences*, 34 F.3d 1048, 1052 (Fed. Cir. 1994). “To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim.” *Brown v. 3M*, 265 F.3d 1349 (Fed. Cir. 2001). “All words in a claim must be considered in judging the patentability of that claim against the prior art.” *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970).

Shang et al.

Shang et al. discloses a plasma-enhanced vapor deposition (PECVD) apparatus 10 having a deposition chamber 12. See Shang et al., Figure 1; column 4, lines 15-21. The deposition chamber 12 has an opening through a top wall 14 and a shower head 16 within the opening. See *id.* at Figure 1; column 4, lines 22-24. The shower head 16 forms a single inlet leading directly into the chamber 12. See *id.* at Figure 1.

Applicants submit that Shang et al. fails to anticipate Claims 48-53, 55, and 56 as amended. First, Shang et al. does not disclose two inlets (the first and second inlets) leading directly into the process chamber, as recited in Claim 48 as amended. Neither does Shang et al. disclose a “second inlet positioned to open into the flow path between the first inlet and the outlet,” as recited in Claim 48 as amended. Finally, the reference does not disclose an inlet insert located in the second inlet, as recited in Claim 48. Therefore, Shang et al. does not show every element and limitation of Claim 48, and thus fails to anticipate Claim 48. Claims 49-53, 55, and 56 depend directly or indirectly from Claim 48, and thus are not anticipated by Shang et al. for substantially the same reasons.

Applicants also submit that Shang et al. fails to anticipate Claim 64. Shang et al. discloses a substantially rectangular-shaped shower head 15. See *id.* at Figure 2A; column 4,

lines 35-42. The shower head 15 includes multiple cone-shaped holes 17 extending from the top surface 15A of the shower head 15 to its bottom surface 15B. *See id.* at Figure 2B; column 4, lines 37-42. Shang et al., however, does not disclose a plate of a substantially oval shape, as recited in Claim 64 as amended. Nor does the reference disclose a limitation in Claim 48: “the flow blocking section and the opening are together configured to alter a path of the reactive flow such that the reactive flow widens as it issues from the inlet relative to a flow pattern from the inlet in the absence of an inlet plate,” as recited in Claim 64. Each of the cone-shaped holes 17 disclosed in the reference narrows a reactive flow passing therethrough from over the top surface 15A to under the bottom surface 15B, and on the whole the showerhead plate distributes flow over its surface, and does not widen relative to the absence of that plate. *See id.* at Figure 2B; column 4, lines 37-42. Therefore, Shang et al. fails to show exactly what is claimed in Claim 64, and thus does not anticipate Claim 64.

Claim 65 has been canceled, rendering the rejection of this claim as moot.

Park

Park discloses an ashing apparatus for a semiconductor device having ring-shaped pipes. *See* Park, paragraph [0003]. The ashing apparatus includes a reaction chamber 10, an ion ejector 11, a ring-shaped distribution pipe 50. *See id.* at Figures 3, 3A, 4, and 5; paragraphs [0025], [0027]-[0029]. The ion ejector 11 forms a single inlet leading directly into the chamber 10. *See id.* at Figure 3; and paragraph [0025]. Figure 5 of Park does not show that the ring-shaped distribution pipe 50 generates an ion flow into another flow path from the inlet to an outlet within the chamber 10. *See id.* at Figure 5; paragraph [0032].

Applicants submit that Park fails to anticipate Claims 48-52, and 54. First, Park does not disclose two inlets (the first and second inlets) leading directly into the process chamber, as recited in Claim 48 as amended. Neither does Park disclose a “second inlet positioned to open into the flow path between the first inlet and the outlet,” as recited in Claim 48 as amended. Finally, the reference does not disclose an inlet insert located in the second inlet, as recited in Claim 48. Therefore, Park does not show every element and limitation of Claim 48, and thus cannot anticipate Claim 48. Claims 49-52, and 54 depend directly or indirectly from Claim 48, and thus are not anticipated by Park for substantially the same reasons.

Okuda et al.

Okuda et al. discloses a vertical type semiconductor device producing apparatus. *See* Okuda et al., paragraph [0001]. Okuda et al. discloses a reaction tube 32 constituting a reaction chamber. *See id.* at Figures 6A and 6B (see below); and paragraph [0039]. The reference also discloses first and second gas supply tubes 41, 38. *See id.* at Figures 6A and 6B; and paragraph [0040]. The first gas supply tube 41 is connected to one side of the reaction tube 32. *See id.* The second gas supply tube 38 is also connected to the one side of the reaction tube 32. *See id.*

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FIG. 6A

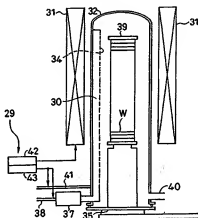
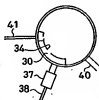


FIG. 6B



Applicants submit that Okuda et al. fails to anticipate Claims 48-52, 54, 55, 57, and 58. The reference does not show exactly what is claimed in the claims, and thus the claims as amended cannot be anticipated by the reference.

Okuda et al. fails to disclose that "the second inlet is positioned to open into the flow path

between the first inlet and the outlet,” as recited in Claim 48 as amended. Okuda et al. states that “the first gas supply tube 41 is connected to one side of the reaction tube 32 ... , and the second gas supply tube 38 is connected to the one side of the reaction tube 32.” *See id.* at paragraph [0040]. In addition, Figure 6B of Okuda et al. depicts that the first and second gas supply tubes 41, 38 are connected to one side of the reaction tube 32. *See id.* at Figure 6B. Access holes for the first and second gas supply tubes 41, 38 are positioned proximate to each other, both facing a boat 39 where wafers are stacked. *See id.* at Figures 6A and 6B. Given this configuration, the access holes would generate two flow paths which independently lead to the boat 39. Therefore, the access holes 34 for the second gas supply tube 38 are not positioned to open into a flow path between the access holes for the first gas supply tube 41 and the exhaust tube 40. Nor are the access holes for the first gas supply tube 41 positioned to open into a flow path between the access holes for the second gas supply tube 38 and the exhaust tube 40. Therefore, Okuda et al. does not disclose the position of the second inlet, as recited in Claim 48.

As such, Okuda et al. does not show every element and limitation of Claim 48, and thus fails to anticipate Claim 48. Claims 49-52, 54, 55, 57, and 58 depend directly or indirectly from Claim 48, and thus are not anticipated by the reference for substantially the same reasons.

Applicants also submit that Okuda et al. fails to anticipate Claim 64. Okuda et al. only discloses a nozzle 30 which stands in the reaction tube 32 along the boat 39. *See id.* at paragraph [0041]. The nozzle 30 has a large number of access holes along an axial direction of the nozzle such as to be respectively opposed to the large number of substrates stacked on the boat 39. *See id.* at paragraph [0041]. The reference, however, fails to disclose “an inlet plate comprising a plate of a substantially oval shape,” as recited in Claim 64 as amended. Therefore, Okuda et al. does not show every element and limitation of Claim 64, and thus fails to anticipate Claim 64.

Claim 65 has been canceled, rendering the rejection of this claim as moot.

As explained above, none of the references anticipate Claims 48 and 64. Claims depending directly or indirectly from Claims 48 or 64 are not anticipated by the references for substantially the same reasons. For all of these reasons, Applicants respectfully request withdrawal of this rejection.

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Discussion of Rejection Under 35 U.S.C. § 103

The Examiner rejected Claims 54, 57-59 under 35 U.S.C. § 103 (a) as being unpatentable over Shang et al.

Standard for Obviousness Rejection

The Patent and Trademark Office has the burden under section 103 to establish a *prima facie* case of obviousness. *In re Piasecki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-87 (Fed. Cir. 1984). To establish a *prima facie* case of obviousness, three basic criteria must be met: first, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; second, there must be a reasonable expectation of success; and finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* M.P.E.P. § 2143.

Applicants submit that the reference does not establish a *prima facie* case of obviousness with respect to the amended claims. The reference does not teach or suggest all the claim limitations. As discussed above, Shang et al. does not disclose two inlets (the first and second inlets) leading directly into the process chamber, as recited in Claim 48 as amended. Neither does Shang et al. disclose a “second inlet positioned to open into the flow path between the first inlet and the outlet,” as recited in Claim 48 as amended. Finally, the reference does not disclose an inlet insert located in the second inlet, as recited in Claim 48. The reference, therefore, does not teach or suggest all the claim limitations of Claim 48. Thus, Applicants submit that Claim 48 is patentable over Shang et al.

The rejected Claims 54, and 57-59 depend directly or indirectly from Claim 48, and are allowable for substantially the same reasons. For all of these reasons, Applicants respectfully request withdrawal of this rejection.

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CONCLUSION

In view of Applicants' amendments to the claims and the foregoing remarks, Applicants respectfully submit that the present application is in condition for allowance. Should the Examiner have any remaining concerns, which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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